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## Running the RF at higher beam energy and intensity

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The improvements done to the RF parameters and hardware in 2011 are reviewed. We then present the upgrades planned for 2012: Further reduction of capture losses with the longitudinal damper, batch per batch blow-up at injection and modification of the blow-up to preserve bunch profile. Operation at higher energy is readily possible with the present RF power, and does not degrade longitudinal stability thanks to the controlled longitudinal emittance growth during the ramp. For operation with higher beam current, the observations in 2011 indicate that there is no single bunch issue with up to  $3 \times 10^{11}$  p per bunch. With the large gain of the RF feedback and One-Turn feedback, the cavity impedance at the fundamental will not be a limitation for ultimate intensity ( $1.7 \times 10^{11}$  p per bunch) with 25 ns spacing. The klystron power (300 kW RF at saturation) is sufficient for 25 ns operation with nominal intensity (2808 bunches per beam,  $1.1 \times 10^{11}$  p per bunch). An RF roadmap for going beyond will be outlined: It calls for an upgrade of the LLRF only and should allow for operation with ultimate beam intensity (25 ns spacing, 2808 b,  $1.7 \times 10^{11}$  p per bunch) after LS1.

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